

P a t e n t C l a i m s :

1. A method for the determination of the critical current
5 for a conductor including superconducting material,
- wherein said conductor is brought into a
superconducting state,
- and wherein a varying external magnetic field is ge-
nerated through which said conductor is conveyed,
10 - and wherein a first measurement means is used to carry
out a first contact-free measurement of the resulting
magnetic field that occurs as a consequence of the
influence of said external magnetic field on the
conductor, c h a r a c t e r i z e d in that the part
15 of the resulting magnetic field out of phase with the
external magnetic field is determined, and that the
critical current of the conductor is determined on the
basis thereof.
- 20 2. A method according to claim 1, c h a r a c t e r -
i z e d in that in addition to said first measurement
of the resulting magnetic field from a first side in
relation to the conductor, a further, second measurement
of the resulting magnetic field is carried out from
25 another side in relation to the conductor using a second
measurement means.
- 30 3. A method according to claim 2, c h a r a c t e r -
i z e d in that on the basis of said first measurement,
or any value derived therefrom, and on the basis of said
second measurement, or any value derived therefrom,
compensation is made for measurement variations that
occur as a consequence of variations in distance between
35 conductor and measurement means.

4. A method according to claim 3, characterized in that said compensation is made by means of the formula $U = ((A+B) - k(A-B)^2) / 2$, wherein a corrected field value U is determined on the basis of the value A that is the field value from said first measurement or a value derived therefrom, and on the basis of the value B from that is the field value of said second measurement or a value derived therefrom.

5. An apparatus for the determination of the critical current for a conductor including a superconducting material, wherein said apparatus comprises

- a conveyor arranged to convey the conductor through the apparatus
- a cryostat arranged to cool the conductor and to make it reach a superconducting state,
- a field generation device arranged to generate a varying magnetic field through which the conductor is conveyed, and
- a first measurement means arranged to carry out a measurement of the resulting magnetic field that occurs as a consequence of the influence of said magnetic field on said conductor,

characterized in that the apparatus further comprises means arranged to determine the part of the of the resulting magnetic field out of phase with the external magnetic field, and on the basis of this to determine the critical current of the conductor.

6. An apparatus according to claim 5, characterized in that the field generating device comprises Helmholtz coils.

7. An apparatus according to claim 5 or 6, characterized in that said first

measurement means is arranged to carry out a measurement of the resulting magnetic field from a first side in relation to the conductor, and that the apparatus further comprises a second measurement means arranged to carry out a measurement of the resulting magnetic field from another side in relation to the conductor.

8. An apparatus according to claim 7, characterized by further comprising compensating means arranged to compensate, on the basis of measurements from said first and said second measurement means or values derived therefrom, for measurement variations due to the distance between conductor and measurement means.

9. An apparatus according to claim 8, characterized in that said compensating means is arranged to carry out said compensation by using the formula $U = ((A+B) - k(A-B)^2) / 2$, wherein a corrected field value U is determined on the basis of said measured field value A from said first measurement means or any value derived therefrom, and on the basis of the measured field value B from said second measurement means or any value derived therefrom.

10. An apparatus according to one or more of claims 5-9, characterized in that said cryostat comprises a mechanical control device for controlling the conveyance of the conductor through the cryostat, and that said cryostat is arranged to contain a coolant for cooling the conductor.

11. An apparatus according to claim 10, characterized in that said control device comprises two separate guides between which the conductor

is freely suspended, and that said field generating device and measurement device are arranged between the two guides.

5 12. An apparatus according to claim 10 or 11, characterized in that said control device comprises two slide guides.

10 13. An apparatus according to claim 12, characterized in that said guides are made of high density polyethylene.

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